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PATENT & TRADEMARK OFFICE

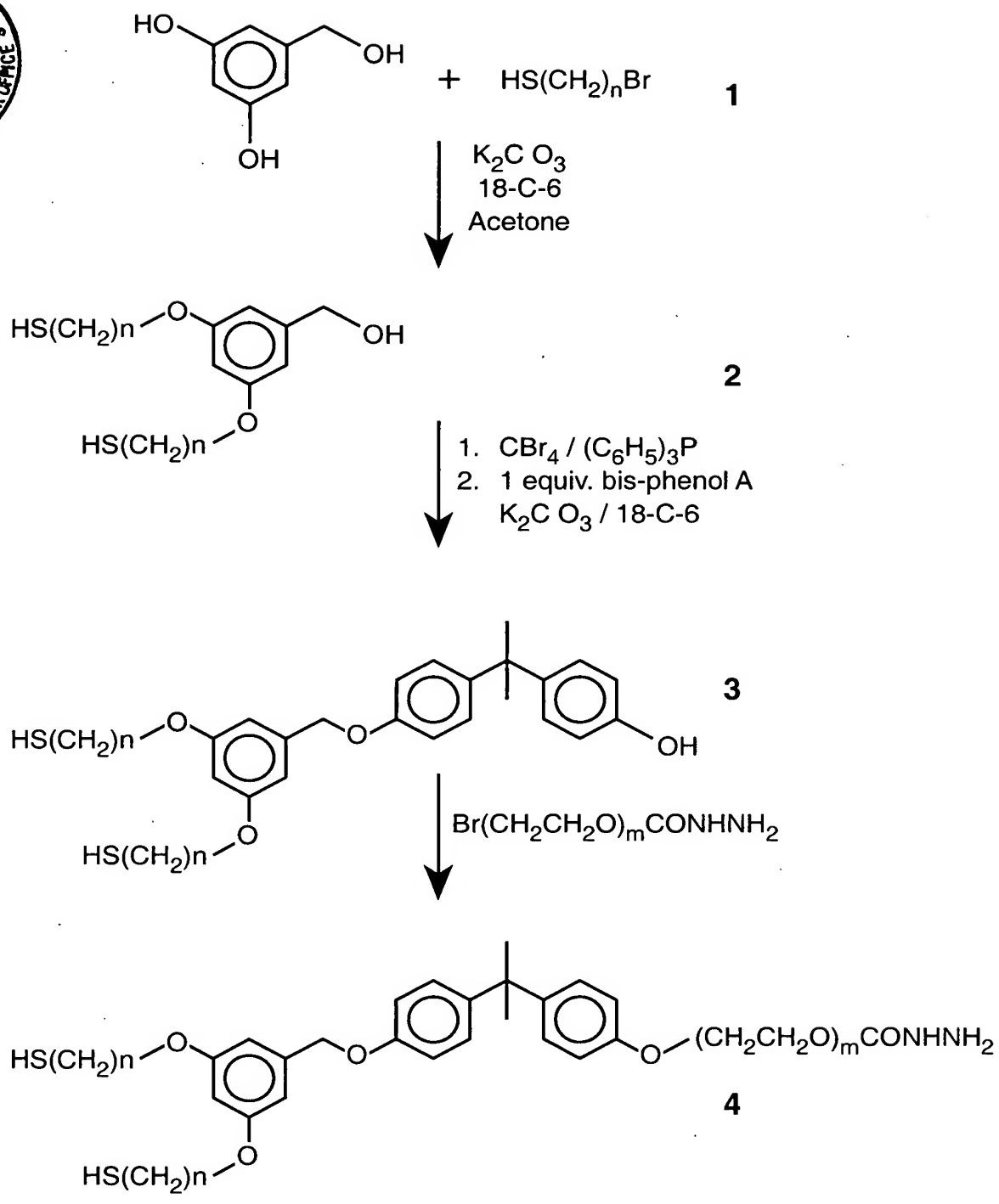


FIG._1

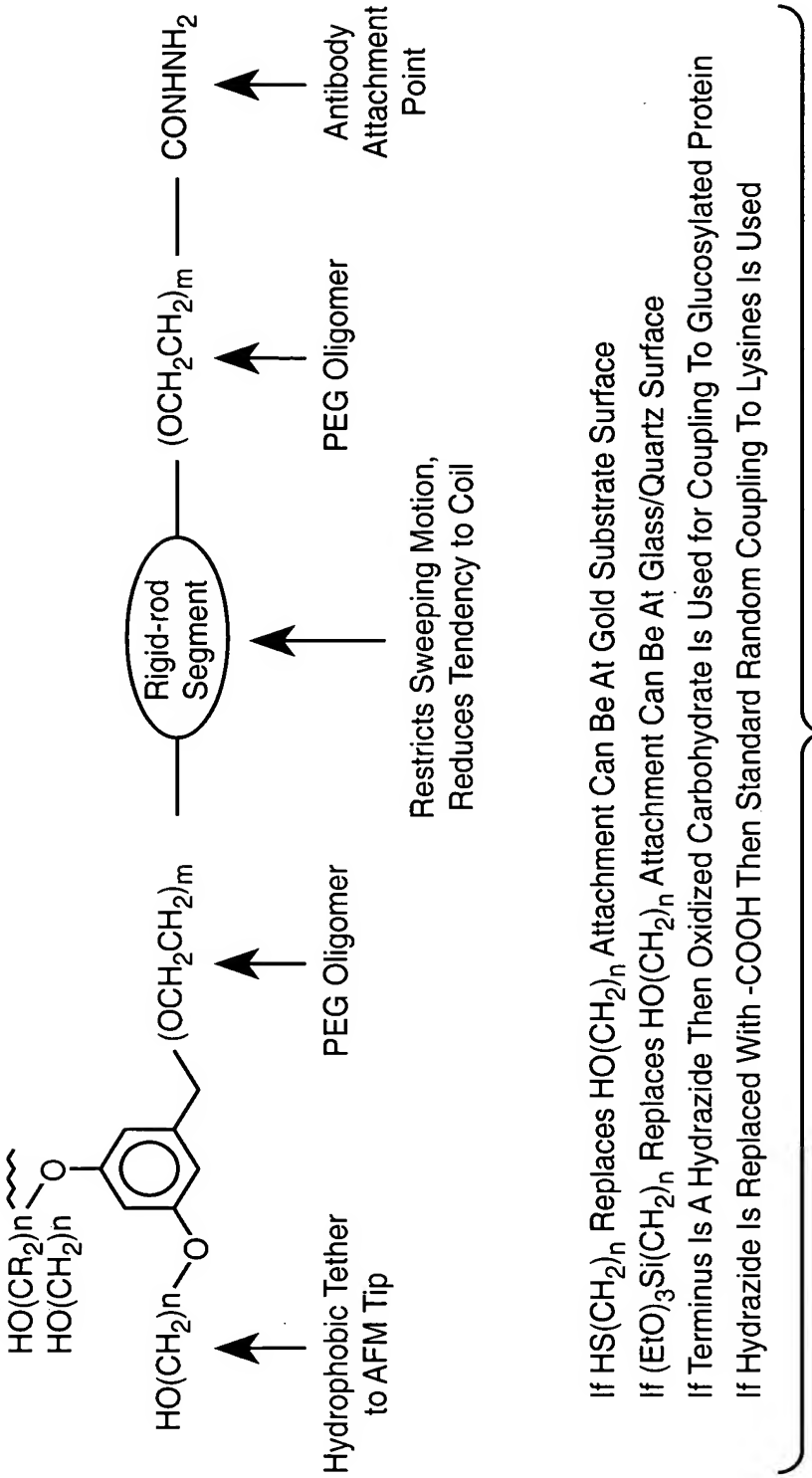

HO(CR2)n
HO(CH2)n
HO(CH2)n
(OCH2CH2)m
(OCH2CH2)m
CONHNH2
Rigid-rod Segment
Hydrophobic Tether to AFM Tip
PEG Oligomer
PEG Oligomer
Restricts Sweeping Motion, Reduces Tendency to Coil
Antibody Attachment Point
If HS(CH2)n Replaces HO(CH2)n Attachment Can Be At Gold Substrate Surface
If (EtO)3Si(CH2)n Replaces HO(CH2)n Attachment Can Be At Glass/Quartz Surface
If Terminus Is A Hydrazide Then Oxidized Carbohydrate Is Used for Coupling To Glucosylated Protein
If Hydrazide Is Replaced With -COOH Then Standard Random Coupling To Lysines Is Used

FIG._2

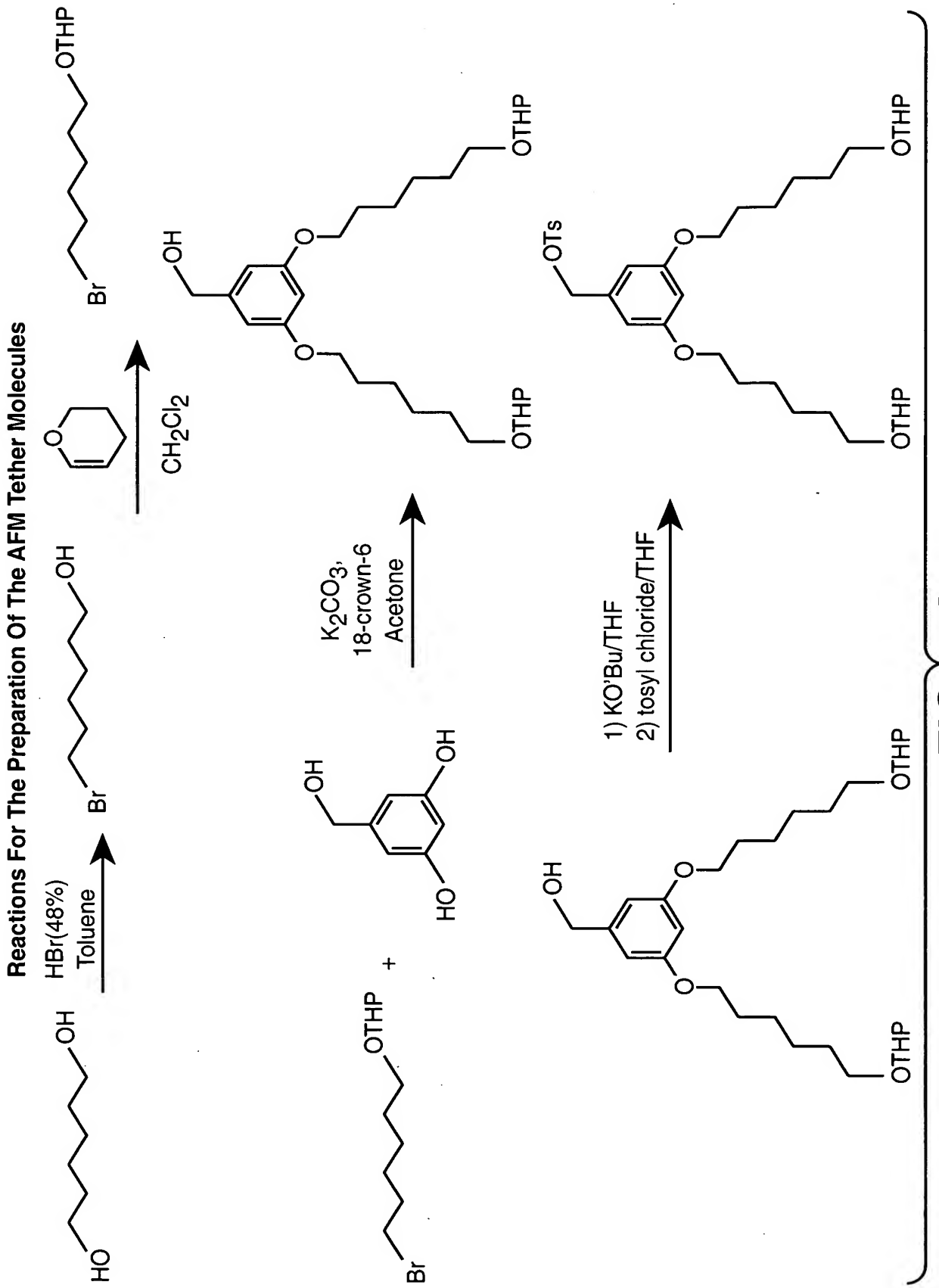

Reactions For The Preparation Of The AFM Tether Molecules
HBr(48%)
Toluene
CH_2Cl_2
K_2CO_3,
18-crown-6
Acetone
1) KO'Bu/THF
2) tosyl chloride/THF
OH
HO
Br
OTHP
OTs
O

FIG._3A-1

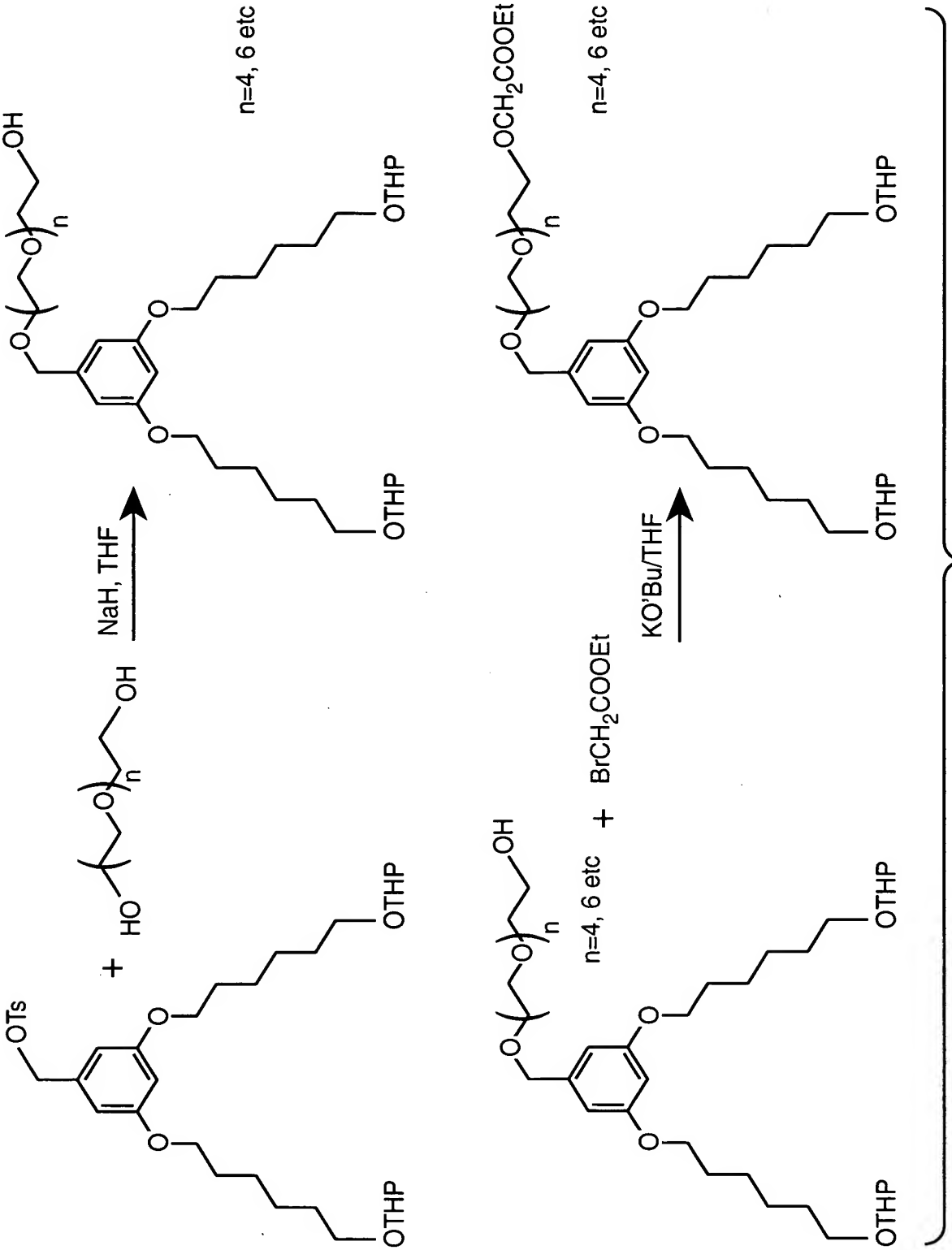
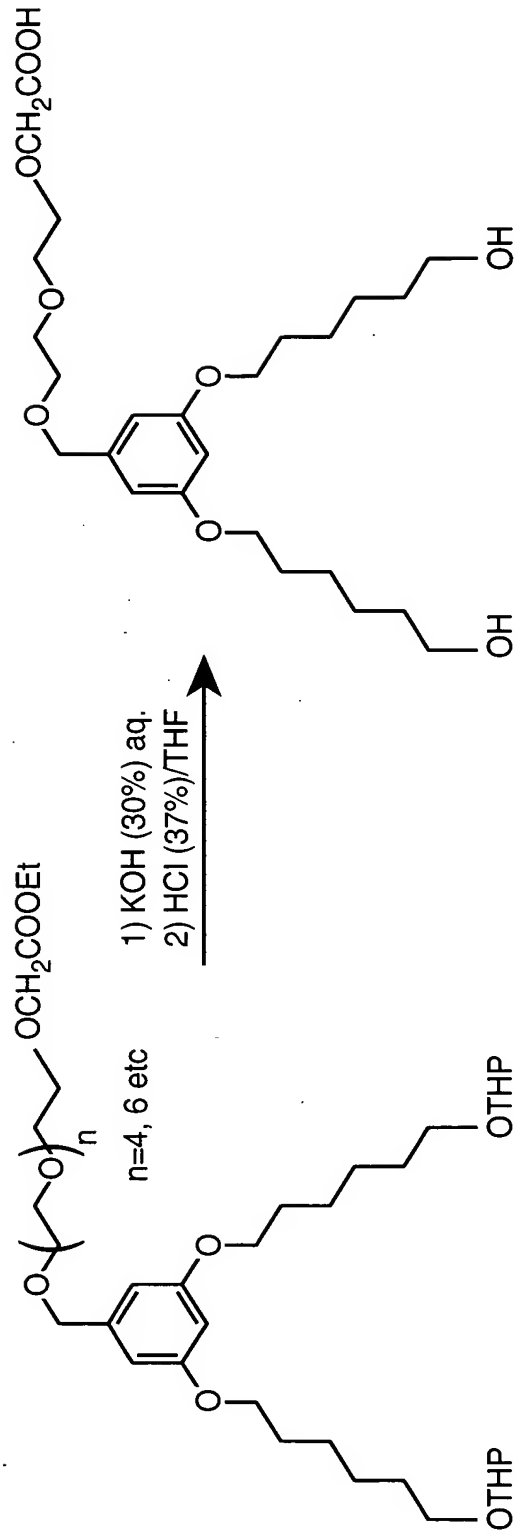
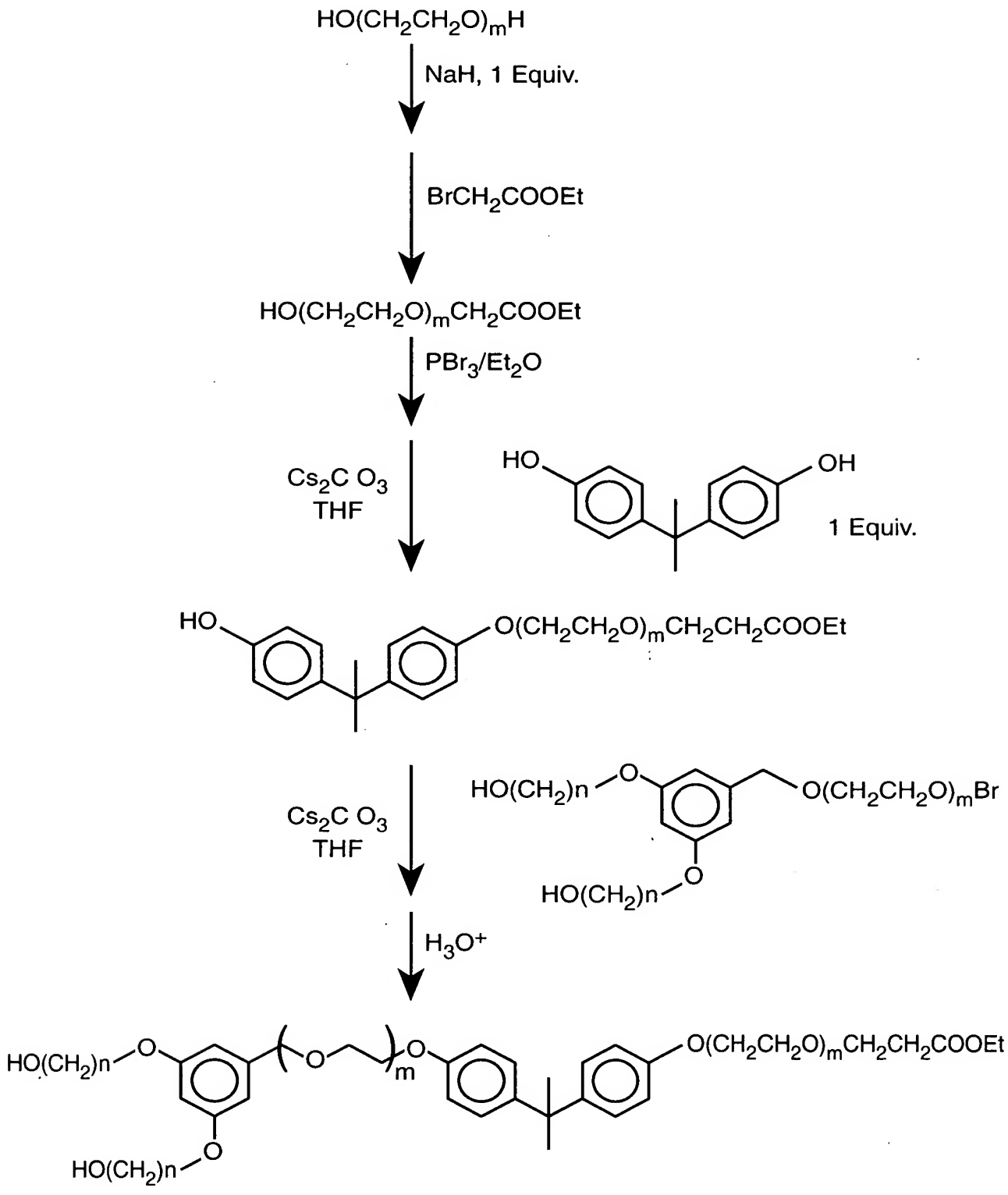

OTs
OTHP
OTHP
+
HO
OH
n
NaH, THF
n=4, 6 etc
OH
OTHP
OTHP
OH
n
+ BrCH2COOEt
KO'Bu/THF
n=4, 6 etc
OCH2COOEt
OTHP
OTHP

FIG._3A-2



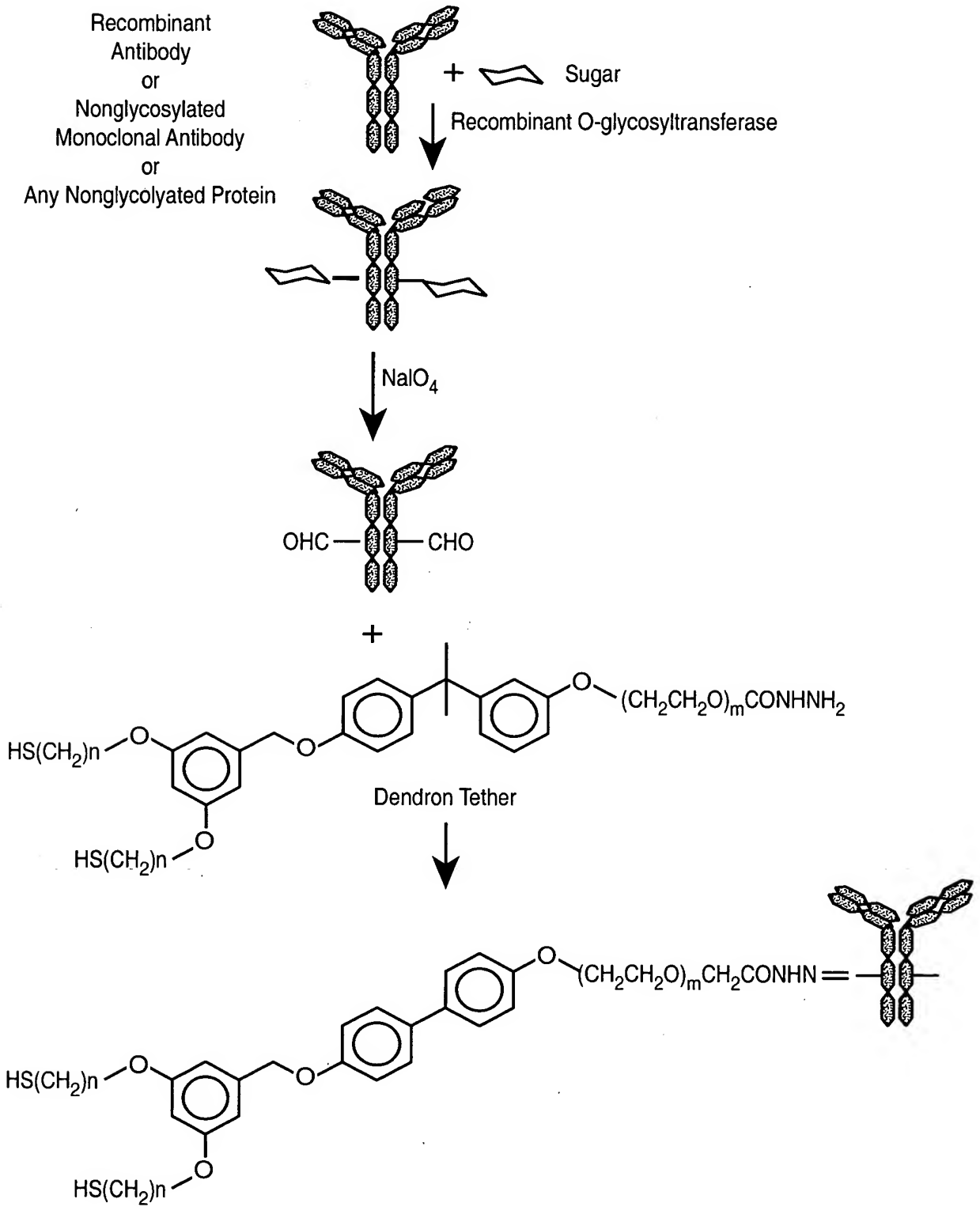
Scheme 1: Synthesis Of Carboxy Terminated AFM Tether With 2 Points Of Attachment

FIG._3A-3



Scheme 2: Representative Synthetic Strategy For Insertion Of Rigid Rods

FIG._3B



Synthesis Of Antigen-specific Capture Agent Tethered To A Dendrimer Functionalized For Self-assembly On A Gold Surface

FIG._4

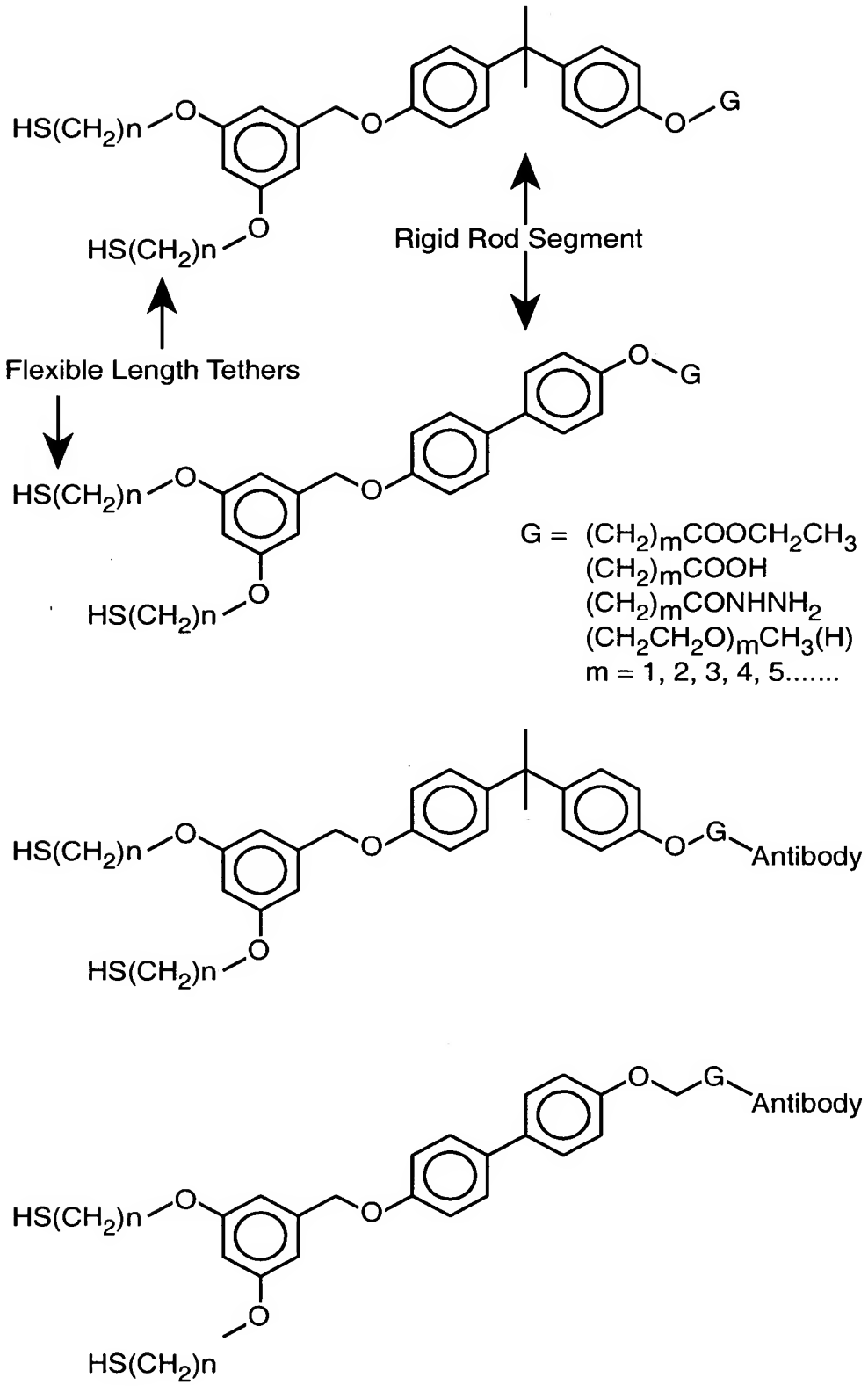

HS(CH2)n
HS(CH2)n
Rigid Rod Segment
Flexible Length Tethers
G
G = (CH2)mCOOCH2CH3
(CH2)mCOOH
(CH2)mCONHNH2
(CH2CH2O)mCH3(H)
m = 1, 2, 3, 4, 5.....
Antibody
Antibody

FIG._5

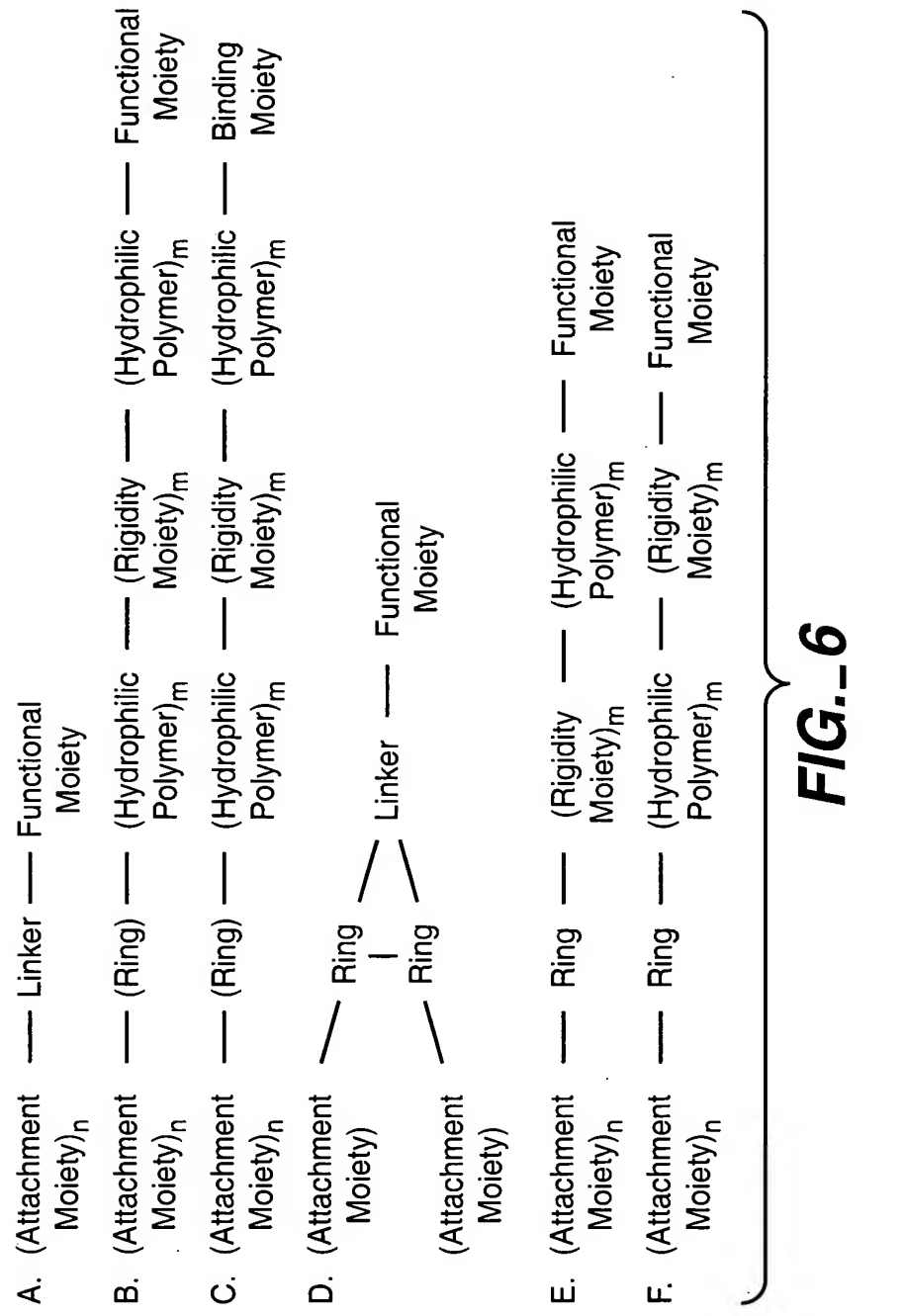
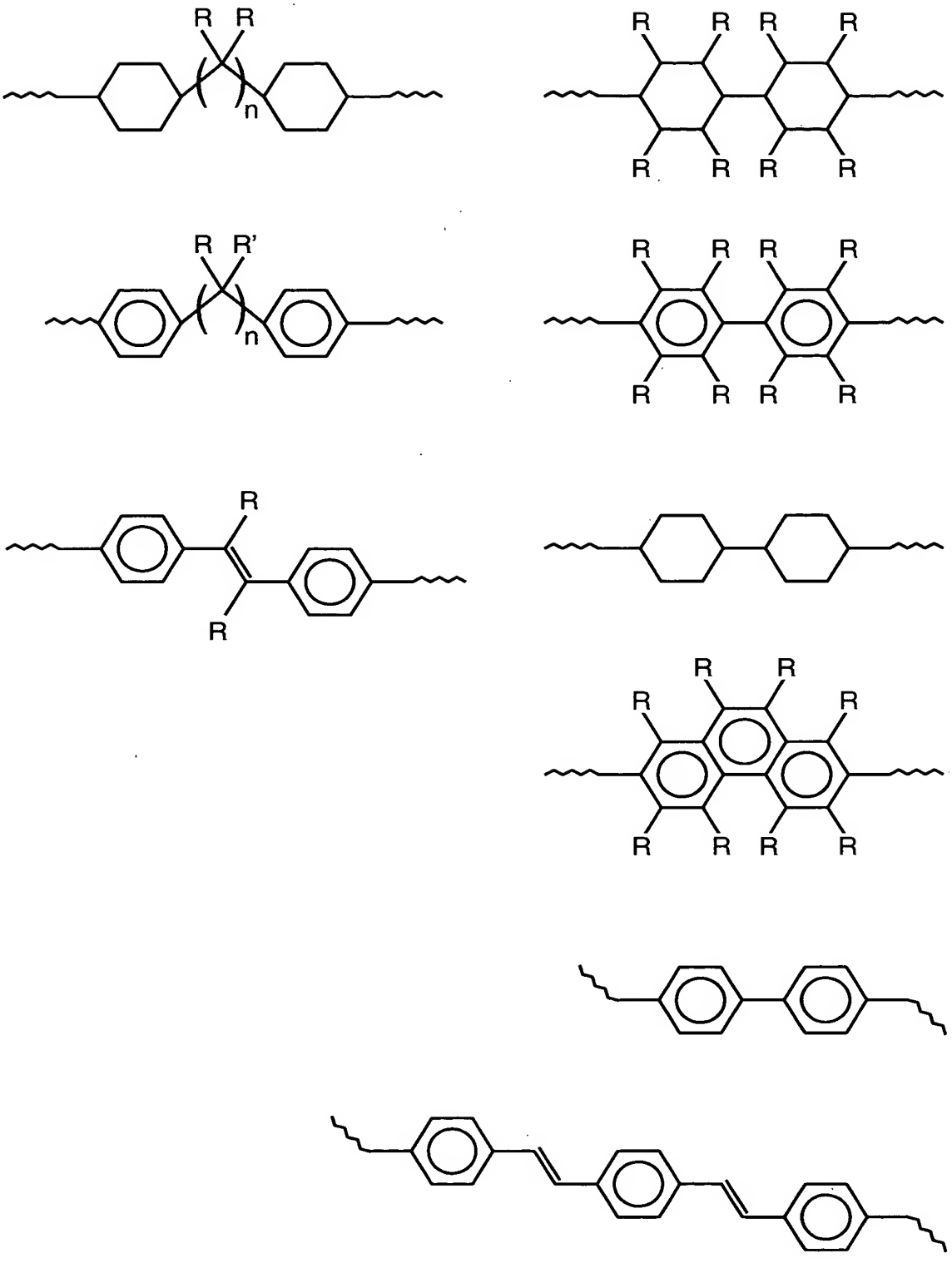

A. (Attachment Moiety)n — Linker — Functional Moiety
B. (Attachment Moiety)n — (Ring) — (Hydrophilic Polymer)m — (Rigidity Moiety)m — (Hydrophilic Polymer)m — Functional Moiety
C. (Attachment Moiety)n — (Ring) — (Hydrophilic Polymer)m — (Rigidity Moiety)m — (Hydrophilic Polymer)m — Binding Moiety
D. (Attachment Moiety) Ring — Ring — Linker — Functional Moiety (Attachment Moiety)
E. (Attachment Moiety)n — Ring — (Rigidity Moiety)m — (Hydrophilic Polymer)m — Functional Moiety
F. (Attachment Moiety)n — Ring — (Hydrophilic Polymer)m — (Rigidity Moiety)m — Functional Moiety

FIG._6



Potential Rigid Rod Segments

FIG._7